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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/642,615

08/19/2003

Ali Afzali-Ardakani

YOR920030023US1

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05/12/2009

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EXAMINER

GAKH, YELENA G

ART UNIT

PAPER NUMBER

1797

MAIL DATE

DELIVERY MODE

05/12/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/642,615	Applicant(s) AFZALI-ARDAKANI ET AL.	
	Examiner Yelena G. Gakh, Ph.D.	Art Unit 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 March 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3,4,11-13 and 15-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,4,11-13 and 15-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. In view of the Appeal Brief filed on 03/10/09, PROSECUTION IS HEREBY REOPENED. New grounds of rejections are set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) initiate a new appeal by filing a notice of appeal under 37 CFR 41.31 followed by an appeal brief under 37 CFR 41.37. The previously paid notice of appeal fee and appeal brief fee can be applied to the new appeal. If, however, the appeal fees set forth in 37 CFR 41.20 have been increased since they were previously paid, then appellant must pay the difference between the increased fees and the amount previously paid.

A Supervisory Patent Examiner (SPE) has approved of reopening prosecution by signing below:

/Vickie Kim/

Supervisory Patent Examiner, Art Unit 1797.

2. The examiner considers the subject matter of the pending claims in two ways - first, as the recitation of the *molecular manipulator* as disclosed in the specification, i.e. the molecule, which is capable of acting as tweezers because of changes in its steric structure; and second, as the recitation of the light-sensitive molecule attached to the probe, irrelevant of its function. As demonstrated by the examiner below, the claims considered in the first way are rejected as not being enabled by the specification, since the specification does not enable using the molecules recited in the claims as molecular manipulators, not mentioning the hypothetical nature of the molecules. The claims considered in the second way are rejected over the prior art, since the prior art discloses light-sensitive molecules, specifically azo-molecules undergoing cis-trans isomerism under UV radiation, attached to the probe.

Response to Amendment

3. The amendment filed 02/19/08 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall

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introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: " a central fragment of said light-sensitive compound between said two arms, which comprises a moiety, said moiety comprising a functional group selected from a group consisting of a sulfide, a thiol, and an isonitrile, moiety located between the two arms".

Applicant is required to cancel the new matter in the reply to this Office Action.

Specification

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The specification is objected to as not enabling obtaining and use of the hypothetical molecules disclosed in the specification as the molecular manipulator. The disclosure describes in general terms the Applicants' hypothesis for a possible molecular manipulator, without any evidence for enabling the Applicants' hypothetical molecule. Moreover, the molecules depicted on Figures 1 and 2 are not CA registered (the library search report is attached) and obviously do not exist. The Applicants did not provide any possible synthetic path for obtaining such molecules, not mentioning their testing as molecular manipulators. The hypothesis is not experimentally proven. The structure indicated as an example cannot be used as a manipulator as disclosed in the specification, since it would have a highly non-planar structure, contrary to what is depicted in the drawings. Moreover, its steric configuration and energetic state would not provide conditions favorable for using such molecules as manipulators as can be clearly seen from the prior art described below, which is especially true for the prophetic example depicted on Figure 2.

Claim Rejections - 35 USC § 112

New matter

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

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The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 1, 3-4, 11-13 and 15-18 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The examiner respectfully reminds the Applicants that according to MPEP §2163:

"2163.02. Standard for Determining Compliance with Written Description Requirement:

The courts have described the essential question to be addressed in a description requirement issue in a variety of ways. An objective standard for determining compliance with the written description requirement is, "does the description clearly allow persons of ordinary skill in the art to recognize that he or she invented what is claimed." *In re Gosteli*, 872 F.2d 1008, 1012, 10 USPQ2d 1614, 1618 (Fed. Cir. 1989). Under *Vas-Cath, Inc. v. Mahurkar*, 935 F.2d 1555, 1563-64, 19 USPQ2d 1111, 1117 (Fed. Cir. 1991), to satisfy the written description requirement, an applicant must convey with reasonable clarity to those skilled in the art that, as of the filing date sought, he or she was in possession of the invention, and that the invention, in that context, is whatever is now claimed. The test for sufficiency of support in a parent application is whether the disclosure of the application relied upon "reasonably conveys to the artisan that the inventor had possession at that time of the later claimed subject matter." *Ralston Purina Co. v. Far-Mar-Co., Inc.*, 772 F.2d 1570, 1575, 227 USPQ 177, 179 (Fed. Cir. 1985) (quoting *In re Kaslow*, 707 F.2d 1366, 1375, 217 USPQ 1089, 1096 (Fed. Cir. 1983)). Whenever the issue arises, the fundamental factual inquiry is whether the specification conveys with reasonable clarity to those skilled in the art that, as of the filing date sought, applicant was in possession of the invention as now claimed. See, e.g., *Vas-Cath, Inc. v. Mahurkar*, 935 F.2d 1555, 1563-64, 19 USPQ2d 1111, 1117 (Fed. Cir. 1991). An applicant shows possession of the claimed invention by describing the claimed invention with all of its limitations using such descriptive means as words, structures, figures, diagrams, and formulas that fully set forth the claimed invention. *Lockwood v. American Airlines, Inc.*, 107 F.3d 1565, 1572, 41 USPQ2d 1961, 1966 (Fed. Cir. 1997). Possession may be shown in a variety of ways including description of an actual reduction to practice, or by showing that the invention was "ready for patenting" such as by the disclosure of drawings or structural chemical formulas that show that the invention was complete, or by describing distinguishing identifying characteristics sufficient to show that the applicant was in possession of the claimed invention. See, e.g., *Pfaff v. Wells Elecs., Inc.*, 525 U.S. 55, 68, 119 S.Ct. 304, 312, 48 USPQ2d 1641, 1647 (1998); *Regents of the University of California v. Eli Lilly*, 119 F.3d 1559, 1568, 43 USPQ2d 1398, 1406 (Fed. Cir. 1997); *Amgen, Inc. v. Chugai Pharmaceutical*, 927 F.2d 1200, 1206, 18 USPQ2d 1016, 1021 (Fed. Cir. 1991) (one must define a compound by "whatever characteristics sufficiently distinguish it").

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The specification does not disclose the subject matter of claim 1 highlighted with bold font:

Claim 1 (Currently Amended) A molecular manipulator, comprising:
a light-sensitive compound, said light-sensitive compound comprising:
two arms, each of said two arms comprising an azo double bond;
**and a central fragment of said light-sensitive compound between said two arms,
which comprises a moiety, said moiety comprising a functional group selected from a group
consisting of a sulfide, a thiol, and an isonitrile,**

wherein said light-sensitive compound changes a cis-trans configuration of the double bond in response to illumination by light of a selected wavelength;
and a probe to which the light-sensitive molecule is attached.

There is nothing in the specification, which would indicate that the Applicants possessed the invention recited in the claims. No central fragment between the two arms, comprising a moiety, which comprises a sulfide, a thiol, and an isonitrile, is disclosed in the specification.

Specifically, "[n]ew or amended claims which introduce elements or limitations which are not supported by the as-filed disclosure violate the written description requirement. See, e.g., *In re Lukach*, 442 F.2d 967, 169 USPQ 795 (CCPA 1971) (subgenus range was not supported by generic disclosure and specific example within the subgenus range); *In re Smith*, 458 F.2d 1389, 1395, 173 USPQ 679, 683 (CCPA 1972) (a subgenus is not necessarily described by a genus encompassing it and a species upon which it reads)".

Furthermore, the Applicants did not show any possession of the claimed subject matter, because the disclosure does not provide any structures recited in the pending claim as molecular manipulators, besides the prophetic examples. The prophetic examples are depicted on Figures 1-2. No other structures are disclosed in the specification as the molecular manipulators according to the scope of the claims.

Thus, the Applicants did not show possession of the claimed invention by describing the claimed invention with all of its limitations using such descriptive means as words, structures, figures, diagrams, and formulas that fully set forth the claimed invention. *Lockwood v. American Airlines, Inc.*, 107 F.3d 1565, 1572, 41 USPQ2d 1961, 1966 (Fed. Cir. 1997).

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7. Claims 1, 3-4, 11-13 and 15-18 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The Breath of the Claims

The claims recite in the most general terms “a molecule manipulator” comprising a light-sensitive molecule with two azo double bonds which change their configuration upon light irradiation, with the molecule attached to the probe of a scanned-proximity probe microscope. No specifically synthesized molecules, which can act as molecular manipulators as recited in the claims, are disclosed in the specification. The example depicted on Figures 1 and 2 are not real molecules and are not enabled as the molecular manipulator. The specification does not provide any guidance for synthesis of such molecules or any evidence of its ability to act as a molecular manipulator. The structure provided as an example is highly speculative. No other examples besides the fictitious structure are provided in the specification. No guidance for the synthesis of the molecule recited in the claims is provided in the specification. Thus, the claims recite, first, the molecule, which does not exist and the synthesis of which is not disclosed in the specification, and, second, its functional utility as a “molecular manipulator”, with no evidence whatsoever that it in fact can be used as the molecular manipulator. The forms depicted in the drawings, which should demonstrate its use as the molecular manipulator, are highly improbable and no evidence exists that they can anyhow be obtained.

The Nature of the Invention

The invention recited in the claims is directed toward a hypothetical molecular manipulator based on a known fact of *cis-trans* light-induced transformation of azo-bond.

The State of the Prior Art

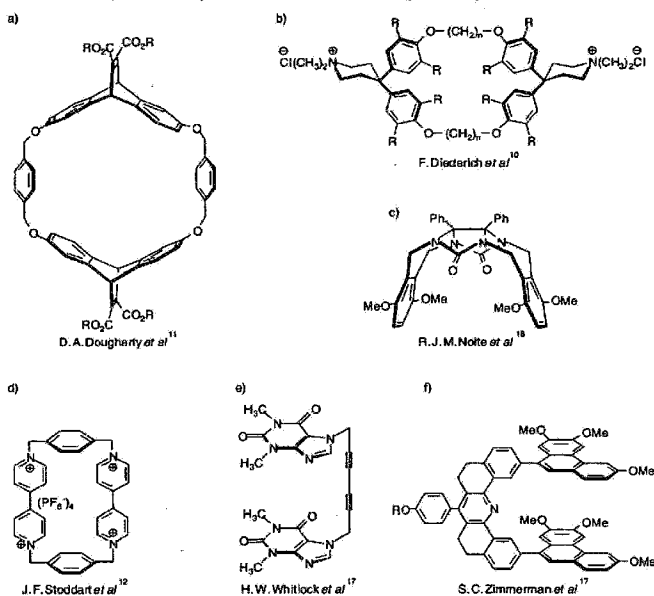
The prior art is in the field of nanotechnology related to “molecular machines” or “molecular tools”. The examiner searched patent and non-patent literature pertinent to molecular tweezers, clips, manipulators, motors, etc.

Klärner et al. (Acc. Chem. Res., 2003) provide a detailed review of “Molecular Tweezers and Clips as Synthetic Receptors” with tweezers and clips containing naphthalene and benzene spacer units, which are synthesized by repetitive Diels-Alder reactions.

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As can be clearly seen from the structures, all tweezers and clips form π - π stacking of the aromatic rings, which is the pre-requisite for the molecules to be the molecular manipulators: “these molecules are well pre-organized because of their belt-type structures. But bond angle distortions require little energy and, therefore, should induce certain flexibility in these systems, allowing the receptor "arms" to be expanded and compressed during the substrate complexation

Scheme 1. Examples of Macrocycles, Molecular Tweezers, and Clips as Receptors for Aromatic Substrates

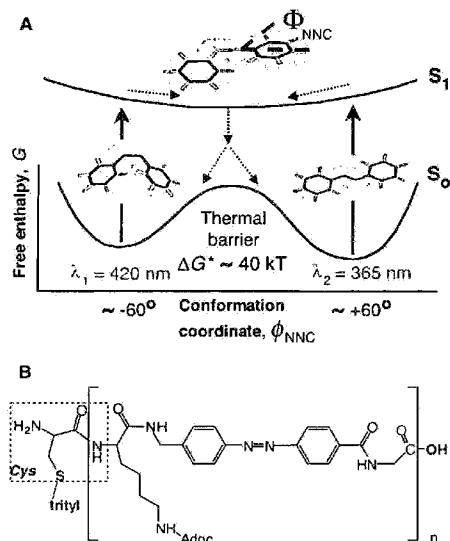


in a way comparable to the working principle of mechanical tweezers. Thus, a fit of the receptor geometry to the substrate topography to a certain extent, induced by the complex formation, can be expected. The size and shape of the receptor cavities can be systematically varied by varying the number and size of the spacer units. Finally, the parent compounds 1a-Ta are simple hydrocarbons containing only nonconjugated benzene and/or naphthalene rings arranged in a belt-like concave-convex topography, so that an aromatic substrate can be bound via multiple π - π and CH- π interactions” (page 920).

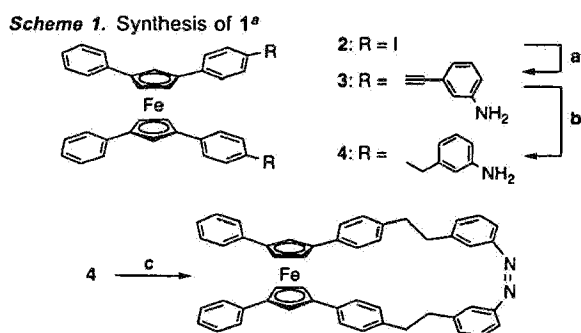
Feringa *et al.* (*Appl. Phys.*, 2002) describe “Light-driven molecular switches and motors” with detailed disclosing of physical-chemical properties of molecular motors comprising double bond, which undergoes light-induced *cis-trans* transformation. Specific requirements should be fulfilled for the switches and motors to perform their functions. Jones *et al.* and Pearson *et al.* (*J. Org. Chem.*, 1997) described in detail “Molecular scale wires with alligator clips” providing their full synthesis and physical-chemical characteristics. A series of papers is devoted to

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molecular devices based on light-induced cis-trans transformation of azo-bond in azobenzene moieties. *Stiller et al. (Surface and Interface Analysis, 2000)* teach “scanning Kelvin microscopy as a tool for visualization of optically induced molecular switching in azobenzene self assembling films”; *Hugel et al. (Science, 2002)* disclose “single-molecule optomechanical cycle” with a detailed study of molecular devices based on photosensitive azobenzene polymers.

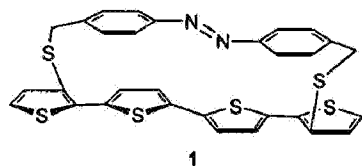


Muraoka et al. (J. Am. Chem. Soc., 2003) describe “light-driven open-close motion of chiral molecular scissors” based on azobenzene expansion and contraction (cis-trans transformation) of N=N bond.



Jousseime et al. (J. Am. Chem. Soc., 2003) teach “photomechanical actuation and manipulation of the electronic properties of linear π -conjugated systems” using azobenzene chromophore.

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Wen et al. (J. Phys. Chem. B, 2005) teach “photochemical-controlled switching based on azobenzene monolayer modified silicon (III) surface”. *Bellini et al. (J. Phys.:Condens. Matter, 2006)* disclose “light-induced molecular motion of azobenzene-containing molecules: a random-walk model”.

The Level of One of Ordinary Skill

The examiner considers this beyond the level of one of ordinary skill in the art to obtain structures disclosed in the specification and in particular depicted on Figures 1A, 2, as molecular manipulators, since, as it can be seen from the above paragraph, creating molecular manipulators requires high skills and knowledge of the chemistry and thermodynamics of the molecular manipulators. Furthermore, the *cis*-conformation depicted on Figure 1A is highly improbable, while its formation is a prerequisite for utilizing the structure of Figure 1A as the molecular manipulator. Moreover, all molecular manipulator (tweezers, scissors, etc.) have well defined stereometric structures, in most cases comprising π - π stacking of the aromatic rings, which allows placing an aromatic molecules in-between the stacked aromatic rings. Such stereochemistry is impossible for the structures of Figures 1, 2.

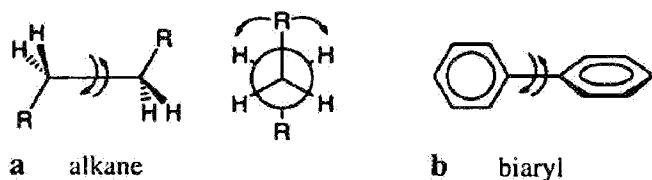
The Level of Predictability in the Art

The prior art does not provide a ground for any expectation of success for using molecules such as depicted on Figure 2, as molecular manipulators. Extensive prior art on molecular manipulators, such as tweezers, scissors, motors, etc., are rigid molecules with well defined stereometry and thermodynamic parameters. As can be seen from the recited papers, all molecular manipulator (tweezers, scissors, etc.) have well defined stereometric structure, in most cases comprising π - π stacking of the aromatic rings, which allows placing an aromatic molecules in-between the stacked aromatic rings.

None of the recited papers indicate the possibility of using molecules recited in the claims and those depicted on Figures 1 and 2 as molecular manipulators. The bulkiness of the *cis*-conformer of a hypothetical structure 1A would assume its high non-planarity, which would

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totally prevent its ability to grab molecules and be used as a molecular manipulator, especially since Ph groups can rotate around the single bond, as indicated by *Feringa et al.*:



The Amount of Direction Provided by the Inventor

The instant disclosure does not provide any direction neither for the synthesis of the hypothetical structures disclosed in the specification, nor for their use as molecular manipulators. The specification does not provide any guidance for transferring trans-form into cis-form as shown in Figure 1A, since cis-form that is drawn on the Figure is highly improbable because of the steric hindrance and energy requirements; since such structure cannot exist, its application as the molecular manipulator is practically improbable. Thus, the inventors did not provide any guidance for obtaining and utilizing the structure depicted in drawings and recited in the claims.

The Existence of Working Examples

No real working examples are provided in the specification for either the synthesis of the compounds disclosed in the specification and their attachment to the microscope probe, or for their application as molecular manipulators. The Applicants did not provide any evidence that the prophetic structure depicted on Figure 1A can exist in *cis*-form, which should be a prerequisite of using this structure as a molecular manipulator.

The Quantity of Experimentation Needed to Make or Use the Invention Based on the Content of the Disclosure

The only prophetic example for the claimed "manipulator" is depicted as structures on Figures 1A and 2. The *cis*-form drawn on Figure 1A is totally unrealistic because of the severe steric hindrance, which would be created between two proximate arms. Since the arms can relatively freely rotate about Ph-Ph bonds, the configuration with the two arms turned to each other would be avoided, even if such molecule could be synthesized. Therefore, the specification discloses unenabled utility of the fictitious molecules, with no guidance for the synthesis of this molecule.

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It would require an undue experimentation for a routineer in the art to obtain molecular manipulators according to the claimed subject matter, because neither an indefinite number of structures recited in broad claims, nor the prophetic examples disclosed in the specification have not been disclosed in the specification as capable of being used as molecular manipulators. Therefore, it is unclear for a person of ordinary skill in the art, how to obtain the structures according to the claims, which can be molecular manipulators, with no guidance in the specification for either making or using such manipulators. Moreover, it seems to be quite improbable for a routineer in the art to obtain any structure similar to the one depicted on Figure 1A as a prophetic example of the claimed molecular manipulators, because the structure can hardly exist in *cis*-form.

112 2nd

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 1, 3-4, 11-13 and 15-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites "a molecular manipulator". It is not clear, what is meant by the term "molecular manipulator" in relation to the compound recited in the body of the claim. It is not clear, how such molecule can be "a molecular manipulator". It is also not clear, how the molecule is attached to the probe.

It is further unclear, as to what is the central fragment between the two arms which comprises a moiety, which comprises a functional group. The recitation of the molecular structure provided in the claims is unclear and indefinite.

The Applicants are respectfully referred to the following excerpt from MPEP:

"§2171 Two Separate Requirements for Claims Under 35 U.S.C. 112, Second Paragraph:

The second paragraph of 35 U.S.C. 112 is directed to requirements for the claims:
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

There are two separate requirements set forth in this paragraph:

(A) the claims must set forth the subject matter that applicants regard as their

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- invention; and
(B) the claims must particularly point out and distinctly define the metes and bounds of the subject matter that will be protected by the patent grant.

The first requirement is a subjective one because it is dependent on what the applicants for a patent regard as their invention. The second requirement is an objective one because it is not dependent on the views of applicant or any particular individual, but is evaluated in the context of whether the claim is definite - i.e., whether the scope of the claim is clear to a hypothetical person possessing the ordinary level of skill in the pertinent art.

Although an essential purpose of the examination process is to determine whether or not the claims define an invention that is both novel and nonobvious over the prior art, another essential purpose of patent examination is to determine whether or not the claims are precise, clear, correct, and unambiguous. The uncertainties of claim scope should be removed, as much as possible, during the examination process.

The inquiry during examination is patentability of the invention as applicant regards it. If the claims do not particularly point out and distinctly claim that which applicants regard as their invention, the appropriate action by the examiner is to reject the claims under 35 U.S.C. 112, second paragraph. *In re Zletz*, 893 F.2d 319, 13 USPQ2d 1320 (Fed. Cir. 1989). If a rejection is based on 35 U.S.C. 112, second paragraph, the examiner should further explain whether the rejection is based on indefiniteness or on the failure to claim what applicants regard as their invention. *Ex parte Ionescu*, 222 USPQ 537, 539 Bd. App. 1984)"

Furthermore:

"§2172 Subject Matter Which Applicants Regard as Their Invention:

If the language of the claim is such that a person of ordinary skill in the art could not interpret the metes and bounds of the claim so as to understand how to avoid infringement, a rejection of the claim under 35 U.S.C. 112, second paragraph, would be appropriate. See *Morton Int 'l, Inc. v. Cardinal Chem. Co.*, 5 F.3d 1464, 1470, 28 USPQ2d 1190, 1195 (Fed. Cir. 1993)."

The instant application is an exact case when "the language of the claim is such that a person of ordinary skill in the art could not interpret the metes and bounds of the claim so as to understand how to avoid infringement", and therefore a rejection of the claim under 35 U.S.C. 112, second paragraph, is appropriate.

Claim Rejections - 35 USC § 103

10. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

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11. **Claims 1, 3-4, 11-13, 15, 16 and 18** are rejected under 35 U.S.C. 103(a) as being unpatentable over Stiller et al. (Surface and Interface Analysis, 2000) (Stiller).

Stiller teaches "scanning Kelvin microscopy as a tool for visualization of optically induced molecular switching in azobenzene self assembling films" (Title). The light-sensitive azo-benzene derivative, which acts as a light-sensitive switch, comprises an arm comprising the double bond $-N=N-$, with the arm and the fragment of the molecule to which the arm is attached, attached through SH-moiety to the scanning force microscopy (SFM) probe, which conventionally comprises any of silicon, silicon oxide, aluminum oxide or titanium oxide (Figure 1). The functional group R is CF_3 (a haloalkyl). The probe is coated with gold.

Although Stiller does not specifically disclose a light-sensitive azo-derivative having the second arm comprising the azo double bond, it would have been obvious for a person of ordinary skill in the art to substitute H in SH with the second fragment $CF_3-Ph-N=N-Ph-O-(CH_2)_{10}$, because this will increase the efficiency of the molecular switch based on *cis-trans* transformation of $N=N$ -bond. Modified Siller's molecular manipulator comprises two arms with azo-bond, a central fragment comprising a moiety comprising a thiol and a probe according to the recitation of the claims.

12. **Claim 17** is rejected under 35 U.S.C. 103(a) as being unpatentable over Stiller in view of the prior art disclosed by Nakagawa (US 5,353,632).

While Stiller in view of Steves do not specifically disclose coating comprising trichlorosilane, Nakagawa describes such coating as being conventional and disclosed in the prior art: "the other insulation comprises octadecyl-trichlorosilane (OTS)" (see Background of the Invention, col. 1, line 56). Therefore, it would have been obvious for any person of ordinary skill in then art to apply OTS coating indicated by Nakagawa to the probe disclosed by Stiller modified by Seves as an additional protection layer with an obvious modification of the moiety of the azo-compound to covalently bind to the coating, which would be within the skill of a routineer in the art.

Response to Arguments

13. Applicant's arguments filed 03/10/09 have been fully considered but they are not persuasive.

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Regarding rejection of the pending claims under 35 U.S.C. 112, first paragraph, the examiner did not find any persuasive arguments, which demonstrate enablement of the claimed invention based on factual evidence. Mere recitation of MPEP cannot be considered an adequate response to the examiner's Wand's analysis.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yelena G. Gakh, Ph.D. whose telephone number is (571) 272-1257. The examiner can normally be reached on 9:30 am - 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vickie Y. Kim can be reached on (571) 272-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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5/3/2009

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5/3/2009